Commonwealth of Virginia

Data Strategy

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I.   Acknowledgements

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Jane M. Conroy, International Consulting Services, LLC

Justin Dooley, Virginia Department of Transportation

John Duhart, Virginia Department of Taxation

Ellis Erickson, Virginia Department of Social Services

Will Goldschmidt, Virginia Information Technologies Agency

Mike Hammel, Virginia Information Technologies Agency

Nadine Hoffman, Virginia Information Technologies Agency

Mark D. Monson, Virginia Department of Health Professions

Dave Portner, Virginia Employment Commission

Jim Roberts, Virginia Department of Rehabilitative Services

Lana Shelley, Virginia Department of Motor Vehicles

Mary Kaye Walker, Virginia Department of Motor Vehicles

Lisa Wallmeyer, Joint Commission on Technology and Science

Sean Weir, Virginia Information Technologies Agency

II.   Executive Summary

The Commonwealth needs to streamline government, improve services while reducing costs, and provide greater transparency, while safeguarding privacy. These needs require fast access to accurate data – data which supplies real and actionable business information. Government business cannot be separated from data and information management.

The Commonwealth Data Strategy guides us to help achieve these aims. The Data Strategy is a component within the larger context of the Commonwealth's Enterprise Architecture (EA) – a broad strategic framework to help us manage the complexity of the data and information we depend upon to make decisions.

 The data strategy vision for the Commonwealth views "enterprise data and information managed as a Commonwealth asset to provide value to citizens and stakeholders." This document describes business drivers, principles, and vision – and outlines goals, objectives, and strategies needed to achieve this vision. This document also emphasizes the importance of introducing data management concepts and related best practices to Commonwealth business leaders.

Commonwealth leadership recognizes that business relies on access to, and analysis of, meaningful data. We want our leadership to support the evolution of the data management discipline – not only to meet agency needs - but to support and reap the benefits of sharing data across the Commonwealth.

The Commonwealth has several important initiatives underway which highlight the need for enterprise data management; listed below are but two examples – there are many more opportunities: these projects are happening now – the questions could be more easily answered but because we don't have an enterprise data management program they will struggle.

Evaluating Our Performance
Virginia policy makers want to examine workforce program performance. Are the workforce programs we offer providing the benefits we expected? Are people getting jobs? Do the jobs last? Enterprise data management can help answer these questions, by enabling aggregation of data between disparate agencies and across programs.

Improving Our Service to Citizens
Reducing transaction times for business creation supports economic development and opportunities for citizens. Virginia agencies that "touch" business creation are coming together to create a one-stop portal that reduces the time and complexity involved in registering a business - a collaborative effort across multiple agencies that interact with business customers – "Business One Stop".

These examples point the way to the potential of Commonwealth data management to support business initiatives and the need for information. The Commonwealth currently

has many redundant data stores, for "citizen", "vendor", etc.; we have abundant opportunities to streamline data collection and storage, and improve efficiency, effectiveness, and security.

IT innovation has made it easier to search and exchange information, and can give better understanding of business needs, better service delivery, and clearer documentation of results. Understanding and leveraging the options offered by IT advancements to provide actionable business information can also support more open, transparent government for Virginia's citizens, and provide more public-facing services.

The Commonwealth also faces seeming contradictions - public demand for accessibility and transparency and escalating sensitivity to data privacy. Care must be taken in balancing the "obligation to provide" data with the "obligation to protect" data.

The technology exists to resolve this apparent tension. Our challenge lies, not in a lack of technological enablers, but in finding the organizational will to create a shared business vision and path that shows us how to deploy the tools at our disposal.

The Data Strategy vision points toward a future of unlocking the potential of Commonwealth data assets, and the following goals will allow us to achieve this vision.

The Vision: *Enterprise data and information is managed as a Commonwealth asset to provide value to citizens and stakeholders*

- **Goal 1: Implement an enterprise data management program**
    Data management will provide a common framework for the cost effective sharing of government information across organizational lines while respecting security, privacy and the appropriate use of information.

- **Goal 2: Enable enterprise data sharing**
    Create structures that support collaboration among stakeholders, and facilitate "the responsibility to provide" culture across the Commonwealth, for the sharing of data, information, knowledge and expertise.

- **Goal 3: Establish data governance and oversight**
    Business and IT leaders must provide governance and oversight to ensure that the direction set and decisions made in carrying out the data strategy remain in line with the Commonwealth's business strategy.

These goals are the building blocks of a solid foundation for the ongoing and future leveraging of Commonwealth data assets. The continued commitment and participation of Commonwealth agency stakeholders in advancing this vision is necessary to keep this plan responsive to Commonwealth agencies and the citizens, businesses, and governmental organizations they serve.

III. Preface

The Commonwealth Data Strategy is a component within the larger context of the Commonwealth's Enterprise Information Architecture (EIA), which is a component of Commonwealth's Enterprise Architecture (EA). The EA is a broad strategic framework used to help understand the business of the Commonwealth and to manage the complexity of the interactions between the data and information needed to run Commonwealth business.

As a component of EA, the Enterprise Information Architecture (EIA) is designed to provide a common framework for the cost effective sharing of government information across organizational lines while respecting the security, privacy and appropriate use of that information. It enables agency leaders to manage data and information as a Commonwealth asset to better serve the citizens of Virginia. A well-built enterprise architecture provides a framework within which to ask and share the answers to tough questions, such as:

> Do I have all the information to achieve my goals or to make the strategic decisions I face every day?

> Where can I get information, quickly and easily?

> Is my investment in data and technology cost effective?

The EIA provides a starting point and organizing mechanism for establishing collaboration around data to meet mission needs; multiplying the value of existing "siloed" data holdings through better understanding of what the data means, how to access it and put it to work in support of the Commonwealth's strategic goals. The end result will make data "high-performance" and ready to meet critical needs for real-time relevance—the right information to the right people at the right time.

Implementing the EIA should logically lead to fewer information systems, and fewer incompatible data stores. Data reuse and shared systems will deliver better and more timely information to those who need it, at less cost. State agencies, local governments, industry, the scientific community, academia, and ultimately, the general public will benefit from the Commonwealth's mature data management practices.

The figure below, EIA Data Strategy Context Diagram, shows the relationship of this Data Strategy to the other EIA "pieces and parts" and depicts the relationship of the Data Strategy in the context of the holistic Commonwealth Enterprise Architecture.

Figure 1. EIA Data Strategy Context Diagram
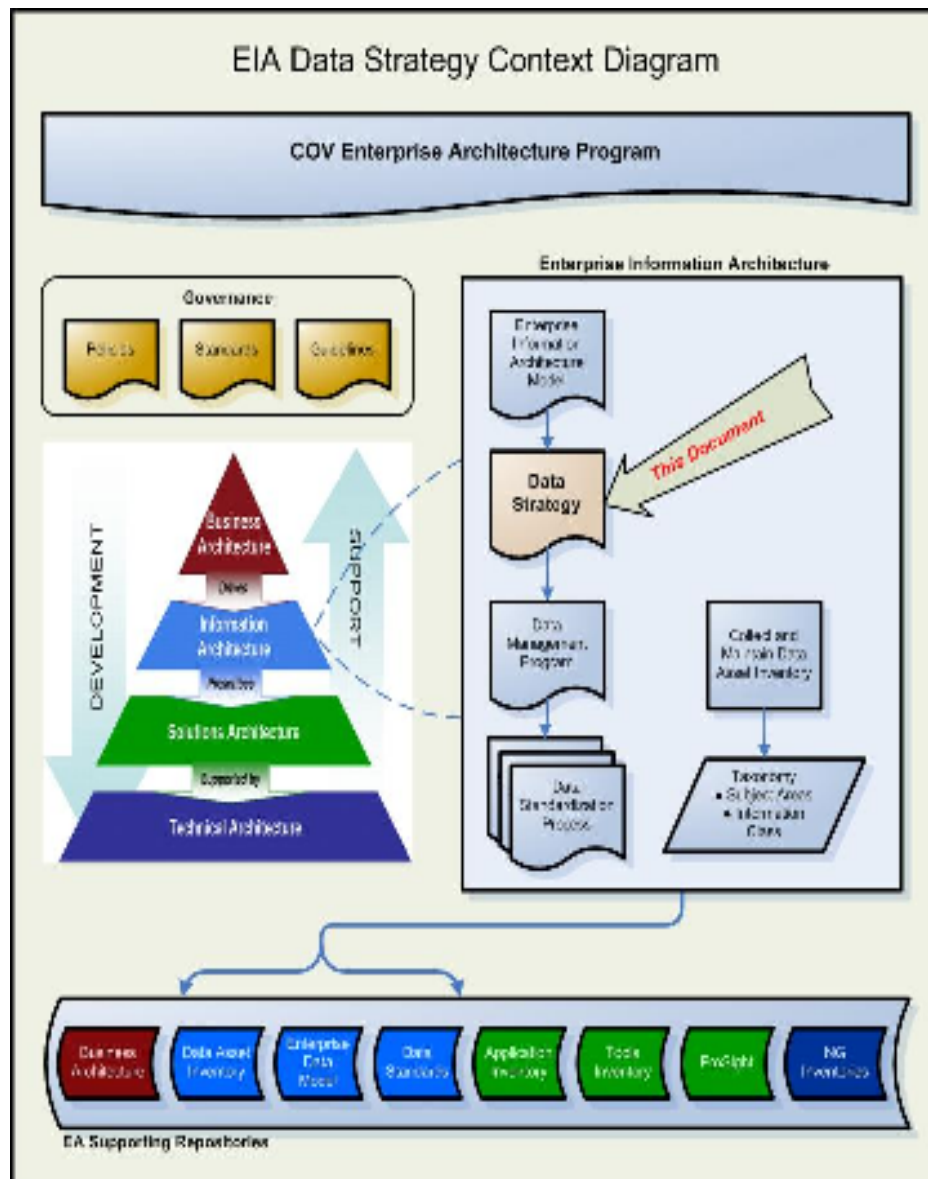
IV.   Purpose of the Strategy

The Commonwealth of Virginia's Data Strategy presents a vision for enterprise data management and the goals and objectives that will lead to achieving that vision.

This strategy offers ways to improve the management of enterprise data and will guide enterprise data initiatives. Enterprise data is defined as:

> Data that is collected by two or more state agencies or shared between state or other entities (local government, federal government or other states). Some examples of enterprise data are: "employee", "citizen", "expenditure" and "vendor".

Likewise, agencies have agency specific data which would <u>not</u> come under this data strategy.

The primary objective of this strategy is to introduce data management concepts and best practices to Commonwealth leadership. This strategy contains business drivers, principles, and a vision for enterprise Commonwealth data. It is supported by goals, objectives, and strategies that will lead us to achieve the vision.

V.   Business Drivers

Streamlining government, improving services while reducing costs, providing greater transparency - all are needs in the Commonwealth today. These needs require access to data that translates into information – and data management is essential in turning data into actionable information.

Every essential action of Commonwealth government depends on access to data, and the ability to mine and manipulate data to retrieve information. Government business cannot be separated from data and information management. Some examples of business drivers demanding data management are summarized in the table below.

Figure 2. Business Drivers

Business Driver	Business Problem	Business Benefit
Need to exchange common data	Government has an ongoing need to collect and exchange common data about citizens and businesses across governmental boundaries and organizations	Common defined names, descriptions, and exchange formats and standards enable effective and efficient sharing and exchange of citizen and business data
Streamline government	Several state agencies have similar business processes without any systematic way of identifying the similarities.	Business need (process) drives data requirements. Defining data standards will help identify duplicate processes across the enterprise.
Simplify interactions with our citizens	Citizens want more user-friendly ways to do business with the Commonwealth.	A common data language enables multiple agencies to work together to provide more seamless services to citizens.
Provide transparency to our citizens and agency management.	Transparency requires that data be discoverable and deliverable. But, to be discoverable it must be defined. Also, delivering data assumes some sort of query or display tool. A lack of data standardization limits transparency of how tax dollars are being invested in state programs and initiatives.	Defining a common language improves communication, collaboration and the ability to summarize data accurately. Defining business information about data is in essence like defining a COV language. What do we mean when we say Vendor or Account or Fund? What is the relationship, if any, between these entities?
Control data redundancy	Data replicated within and especially across agencies increases cost and risk associated with data maintenance, consistency and vulnerability.	Defining and reducing the amount of data redundancy should reduce costs and minimize the risk of data being inaccurate, mismanaged or insecure.
Reduce the cost of impact analysis	Performing impact analysis requires the ability to discover where relevant data resides and what process are affected. Currently this can be costly and cumbersome since Commonwealth data and metadata are not managed.	Managing and making enterprise metadata more accessible will make impact analyses quicker, easier, cheaper and more accurate.
Maintain Virginia's best managed state status	Virginia must show a commitment to continuous improvement.	Improved data and metadata management at the enterprise level can enable all agencies to more effectively address business opportunities. An example of an internal data management opportunity: VA universities want to access public data for students to research and analyze. However, they do not have access to agency metadata that tells them what data is public, where we store it and who owns it to provide access.
Implement an integrated ERP solution	The Commonwealth is challenged by not understanding data across the enterprise. This	By defining an enterprise viewpoint, we will understand the business and data requirements

Business Driver	Business Problem	Business Benefit
	introduces additional challenges as business partners attempt to evaluate and implement the best ERP solution.	which will lead to a more successful implementation of an enterprise solution.
Implement a COV data warehouse and support agency data warehouse efforts.	Analyzing data across agencies is nearly impossible without a central data warehouse. Any agency creating its own data warehouse must reinvent components similar to other agencies.	High level analysis which has been impossible may become possible. Agencies should be able to create analytical environments more quickly and less expensively.

The Commonwealth of Virginia has many business priorities which illustrate the need for enterprise data management. Four example cases, summarized below, reveal some of the benefits of managing and sharing data across agencies.

In the first example, the Commonwealth needs to evaluate the performance of workforce programs. In the second, the Commonwealth needs to improve service by simplifying business registration. In the third, the Commonwealth requires greater transparency in regards to vendor relationships. In the last example, system modernization efforts provide opportunities to establish and implement enterprise data standards across the Commonwealth.

Example #1 - Evaluating Our Performance

Virginia policy makers want to examine holistic workforce program performance. Are the workforce programs we offer providing the benefits we expected? Are people getting jobs? Do the jobs last? How does this information compare to the state's entire workforce population?

The data needed to answer these questions is collected by seventeen (17) workforce programs; employment data is also captured by the Virginia Employment Commission; the Virginia Community College System collects data on all the educational services a workforce program participant receives. This data needs to be commonly defined, brought together, and harmonized where possible to answer questions about the success or failure of our workforce programs. This effort is about holistically understanding the data we collect and creating a integrated environment to support program outcome analysis.

Example #2 – Improving Our Service to Citizens

Reducing transaction times for business creation supports Commonwealth economic development. Virginia agencies that "touch" business creation are coming together to create a one-stop portal that reduces the time and complexity involved in registering a business, getting licenses, filing for permits, and paying bills, etc. The Business One Stop application is a collaborative effort across multiple agencies that interact with business customers. This enterprise application and data store will collect business data once and share it, as authorized. Over time, Business One Stop will become the authoritative system of record for state registered businesses.

Example #3 – Providing an Open and Transparent Government

In 2009, Senate Bill 936 was passed, amending the Code of Virginia to require the establishment of data standards for payments and purchase of goods and services. Defining, adopting and implementing these data standards will ensure suppliers of goods and services to the Commonwealth are managed consistently across agencies. Consistency allows data to be analyzed and summarized across the Commonwealth. In addition to setting data standards, data will be made public via the Auditor of Public Account's searchable database website (Data Point).

Example #4 – Standardizing Enterprise Data

Several large state agencies (DMV, VEC, VDOT and DSS) are in the midst of system modernization efforts. The Commonwealth has the opportunity to establish enterprise data standards to support these new development efforts. These system modernization efforts will result in new agency applications that store and/or share enterprise data. In order to take advantage of this opportunity, agencies will need to work together to standardize enterprise data. The data standardization spectrum is broad – from standardizing the way names and addresses are defined, to uniquely identifying our citizens and vendors. Data standardization will provide more usable information to all.

All four of the above business priority examples are enterprise data projects. All four require:

- Defining a common data model to meet the business requirements (data standards)
- Identifying roles and responsibilities for managing the common data
- Designing how to populate and store, on an ongoing basis, the common data
- Defining a data quality process for ensuring a level of fitness for intended use
- Implementing a means of providing access to the shared data

Over time, enterprise data projects will build the foundation of enterprise data management, and will help to build best practices.

Recent information technology advancements have made it easier to search, exchange and process information to give government leaders better understanding of their organization's business needs, better information for designing efficient and effective service delivery, and clearer documentation of results. These same advancements can support the provision of a more open and transparent government to Virginia's citizens, and more public-facing services.

The ability to quickly discover, access, and understand data and information can mature with cooperation. What has already been accomplished with our existing data collection, storage and usage structures will evolve to deliver new options to support the business of Virginia's government.

This Data Strategy can guide us in common purpose and direction. It points toward where we need improved capacity to manage the complexity of the information we all depend on.

This Data Strategy provides a common framework for the cost effective sharing of government information across organizational lines while ensuring security, respecting privacy and protecting the appropriate use of information. It can enable agency leaders to manage data and information as Commonwealth assets to better serve all of Virginia.

This strategy supports:

> ➢ Public demand for open, transparent government
>
> ➢ A "one government" view to citizens
>
> ➢ A more comprehensive view of customers for government agencies
>
> ➢ A clear view of performance and results of government services, supporting the ability to evaluate and adjust investment in services
>
> ➢ More cost-effective investment in data technology and resources, through re-use and sharing, and elimination of redundant collection and storage

VI.   Current State of Data Management in the Commonwealth

IT business systems across the Commonwealth evolved over time into decentralized, "siloed" systems, with limited point-to-point communication, and use of the data they contain has followed suit. The Commonwealth has many redundant data stores; agencies collect much of the same information about citizens, businesses, vendors and other partners, and secure this data within discreet, agency-owned applications. This stems from "siloed" funding and the lack of any direct incentives for any agency to incur relatively small incremental costs in order to provide benefit to other agencies.

This situation is not uncommon, in either government or private business. However, the technology exists today to advance the way we view, share and use our commonly held data assets.

Each agency incurs its own costs for the collection, storage, security and mining of common data. Common information such as "name and address" exists within hundreds of unique applications within state agencies. Longitudinal information about the performance of combined services, such as education and workforce development programs, is difficult to compile and analyze. Aggregating data to answer larger questions about our performance and outcomes at a Commonwealth level is problematic, and can be "hit or miss" at best.

Aggregating enterprise data for meaningful information and reporting is often a labor-intensive process today. In some cases, the questions we may have about the outcomes of state services are impossible to answer given the fragmented view of data. Clear, holistic views of the results of Commonwealth services and the ability to manipulate data for analysis and forecasting can deliver meaningful, actionable business information to support strategic and operational decisions.

Our opportunities are numerous. We can:

> ➢ Reduce the cost of data ownership and management through sharing.
> ➢ Define enterprise policies and processes for sharing data.
> ➢ Develop incentives and clear means for agencies to work together to share data.
> ➢ Develop an enterprise view of sharing opportunities, and build support structures for sharing.
> ➢ Facilitate and clarify funding mechanisms to support enterprise data sharing
> ➢ Define data governance processes, roles and responsibilities.
> ➢ Identify and reduce redundancies in data collection and storage for reduced cost, greater reliability and increased security.
> ➢ Share a common data architecture and data standards.

> ➢ Establish an enterprise metadata repository.

> ➢ Provide funds with data sharing directives attached.

> ➢ Introduce success measurements related to how well an agency supports and uses shared resources.

VII.   Data Strategy Principles[1]

The following principles are foundational in supporting the vision of this strategy:

Principle 1:   Data and information can be accessed as appropriate, shared as appropriate, and made available to decision-makers as needed

Make data available to all who have an authorized need for it. Collect data once and use it many times - share it. It is critical to weigh the importance of satisfying the Commonwealth's business needs compared to the risk of allowing unauthorized access to sensitive data (citizen privacy). Public data should be made public. Sensitive data must be protected.

The business value is transparency, improved classification of data assets, better data quality, and better access to data as needed to support business decisions.

Principle 2:   Integrated data and information should be available to be analyzed for business objectives

What data does the Commonwealth collect? For what business purpose do we collect it? Can it be shared publicly? Are we redundantly collecting and storing similar data across the Commonwealth? At any point in time, who has the most accurate source of the truth? Ideally, we want one source of the truth. There is no doubt - knowing this information and managing it will better support business objectives.

The business value is in knowing what data we manage today, so we can improve our data management in the future, and provide actionable business information.

Principle 3:   Enterprise data must be understood and trusted by each group that uses it

In order to share our enterprise data, we must first understand how each group uses it. Business users and data stewards must agree to common data definitions, quality, business rules, processes and metrics.   This agreement becomes the trust model for which the enterprise data is governed and shared. Stewardship and single points of accountability for data can contribute to continuous improvement in the quality of data and information.

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[1] These principles have been adapted from those developed by the Office of the Director of National Intelligence (DNI). The Information Sharing vision of DNI was driven by the 9/11 Commission report, which called on U.S. Intelligence Communities to find faster ways to exchange information and eliminate operational barriers. The President and Congress have mandated that the Intelligence Community create a more integrated enterprise where information is routinely shared.

The business value is in understanding and trusting our enterprise data and leveraging it.

Principle 4:   Developing a culture that supports information sharing is central to successful enterprise change

The data sharing mindset is changing from "need to know" to "responsibility to provide". We want to motivate our employees to find efficiencies and improve the services to our citizens by removing data sharing obstacles while still protecting the privacy of our citizens.

The business value is enabling our employees to break down barriers and find creative ways to better serve our citizens.

Principle 5:   Integrating data will enable improved information sharing

There is value in understanding a citizen's complete relationship with the Commonwealth. Bringing together data sets from related services or safety programs can provide valuable information for business leaders to analyze. Integrating data sets across the Commonwealth can provide transparency on performance, and help identify opportunities for improving or modifying existing services.   This use of data will also promote a more customer–centric government, advancing the provision of a "one government" view to customers.

The business value is creating the most efficient and effective services for citizens by sharing one of our most valued assets – data.

Principle 6:   Everyone is responsible for security

Secure collection and dissemination of data, and safeguarding access by a growing number of users, must be ensured. We must protect personal information from misuse or loss, and from unauthorized access, modification or disclosure. We are committed to maintaining systematic and reliable processes for protecting the integrity of the data and for ensuring that all users properly safeguard the data and use it only for authorized purposes.

The business value is protecting the security of data assets and protecting the public trust.

VIII. Data Strategy Vision

The Vision: Enterprise data and information is managed as a Commonwealth asset to provide value to citizens and stakeholders.

Data management provides a common framework for the cost-effective sharing of government information across organizational lines while respecting and protecting security, privacy and the appropriate use of information. It will provide Commonwealth leaders and managers with visibility into data to support decision-making.

As part of this vision, we seek to collect data once and use it numerous times where possible. We want to streamline our collection and storage processes, and integrate data more effectively for strategic and operational needs, both within program areas and across the Commonwealth. We want to better protect the security of data, and the privacy of individuals and organizations while improving access to non-restricted information.

Reducing the number of data collection and storage points will improve both reliability and security in addition to enhancing our ability to mine data assets at the enterprise level. It will also reduce the cost of business processes, decrease service times and increase accuracy.

Fundamental to achieving this vision is supporting and enabling the shift from our past view of data as "siloed" and agency owned, to one where data is viewed and managed as a critical Commonwealth resource. We are moving from local data *ownership* towards shared data and *stewardship* in order for us to more fully realize the benefits of using enterprise data as a Commonwealth asset.

Commonwealth data governance and oversight structure will establish the appropriate venues for making data decisions. It will allow us to reap the benefits of enterprise assets while protecting agency program privacy needs. Some decisions regarding data will be better made at the enterprise level to assure maximum benefit is derived from the sharing, integration and use of data for strategic planning, program-level tactical applications, and operational analysis.

Enhanced data management, information sharing and governance can improve decision making, accelerate service delivery and reduce the costs associated with non-integrated systems, but not without challenges.

The Commonwealth is faced with sometimes seeming contradictions, such as the public's increasing demand for accessibility and transparency and the escalating expectations for data privacy from citizens or as mandated by state or federal code. As citizens become increasingly aware of highly publicized data breaches in both the private and public sectors, expanded data sharing will need to address

the protection of non-public private data. Care must be taken when balancing the "obligation to provide" with the "obligation to protect".

The technology exists to accommodate and resolve this apparent tension. Our challenge is not in a lack of technological enablers, but in finding the organization will to create a shared business vision, illuminating how to deploy the tools at our disposal. This vision will guide our strategies as we move forward on the path toward realizing the Commonwealth's vision.

This strategy can provide guidance to "unlocking" data assets at whatever level of the continuum an agency may find themselves, whether in thinking about enterprise data or agency-held data.   This strategy provides a path. Implementing this strategy will develop the guidance, assistance, contacts, and resources needed for agencies to achieve their part in realizing the Commonwealth's vision.

In order to achieve this vision, the following goals have been identified:

Goal 1: Implement an enterprise data management program

Goal 2: Enable enterprise data sharing

Goal 3: Establish data governance and oversight

The following section provides more details on these goals and outlines the objectives and strategies that will move the Commonwealth toward achieving the vision.

IX.   Goals, Objectives and Strategies

Goal 1: Implement an enterprise data management program

Enterprise data management consists of the planning, execution and oversight of policies, practices and projects that acquire, control, protect, deliver and enhance the value of data and information assets.

The Data Management Association's (DAMA) data management functions and corresponding definitions will be used as the data management functional framework for the Commonwealth data management program. Details of the DAMA functional framework can be found in Appendix B.

Enterprise data management is intended to be a catalyst. It multiplies the value of existing "siloed" data holdings through integration and better understanding of what data means, how to access it and how to employ it in support of strategic goals. Implementing this will lead to fewer incompatible data stores and a future where data will deliver better information to those who need it, at less cost.

Objective 1.1:   Assess, develop and implement data management and infrastructure best practices

    ✋   Strategies:

1.1.1   Assess and align to existing federal and industry exchange standards
1.1.2   Participate in the development of federal and industry standards
1.1.3   Assess current data management infrastructure
1.1.4   Establish metadata standards
1.1.5   Create and maintain metadata repository, which includes a comprehensive inventory of all Enterprise Commonwealth data assets
1.1.6   Align data assets to subject area and information class (data classification taxonomy)
1.1.7   Continue data standardization process

Objective 1.2:   Understand the information needs of the enterprise and all its stakeholders

Objective 1.3:   Capture, store, protect and ensure the integrity of data assets

Objective 1.4:   Continually improve the quality of data and information

Objective 1.5:   Ensure privacy and confidentiality, and to prevent unauthorized or inappropriate use of data and information

Objective 1.6:   Maximize effective use and value of data and information assets

     ✎   Strategies:

1.6.1   Define and adopt vendor data standards
1.6.2   Define and adopt procurement to payment data standards
1.6.3   Define and adopt employee data standards
1.6.4   Define and adopt chart of account data standards

The following strategies under this objective are currently underway:

> Develop a quick inventory of data management products currently being used across the Commonwealth (1.1.3)

> Align data assets to subject area and information class (data classification and taxonomy) (1.1.5)

> Continue data standardization process (1.1.6)

> Continue to define and adopt vendor standards (1.5.1)

> Continue to define and adopt procurement to payment standards (1.5.2)

> Continue to define and adopt employee data standards (1.5.3)

> Continue to define and adopt chart of accounts data standards (1.5.4)

Goal 2: Enable enterprise data sharing

This goal focuses on creating a structure that supports collaboration among Community of Interest (COI) stakeholders, and facilitates "the responsibility to provide" culture across the Commonwealth; sharing information, knowledge and expertise.

COIs are collaborative groups of users who require a shared vocabulary to exchange information in pursuit of common goals, interests, missions or business processes. Some examples of COIs that exist within the Commonwealth today are: Procurement, Finance, HR, Planning & Budget, and Education and Workforce Development.

COI members may include any number of members from government or non-governmental organizations. COI members may also include cross-functional members representing data consumers, data producers, program managers, application developers, and data sharing governance groups. Data governance will supply executive level stewardship to help guide COIs.

COIs work to resolve common issues affecting their communities. They develop products to support an increase in information sharing, volume, speed, and reach out to known and unanticipated authorized users. They also provide organization and maintenance disciplines for the data. COIs can be formed on an ad hoc basis or they can be formally established.

As described in the chart below, agencies may face a shift in how they think about their data. In some cases, agencies may hold the same data in many stores within their own agency, and how to think about sharing at a Commonwealth level may seem difficult. And yet, providing the Commonwealth Data Strategy can help move us all further toward the vision, both at the enterprise and agency level. Figure 3 illustrates this concept of transition from our current state to our desired future state.

Figure 3. New Information Sharing Model[2]
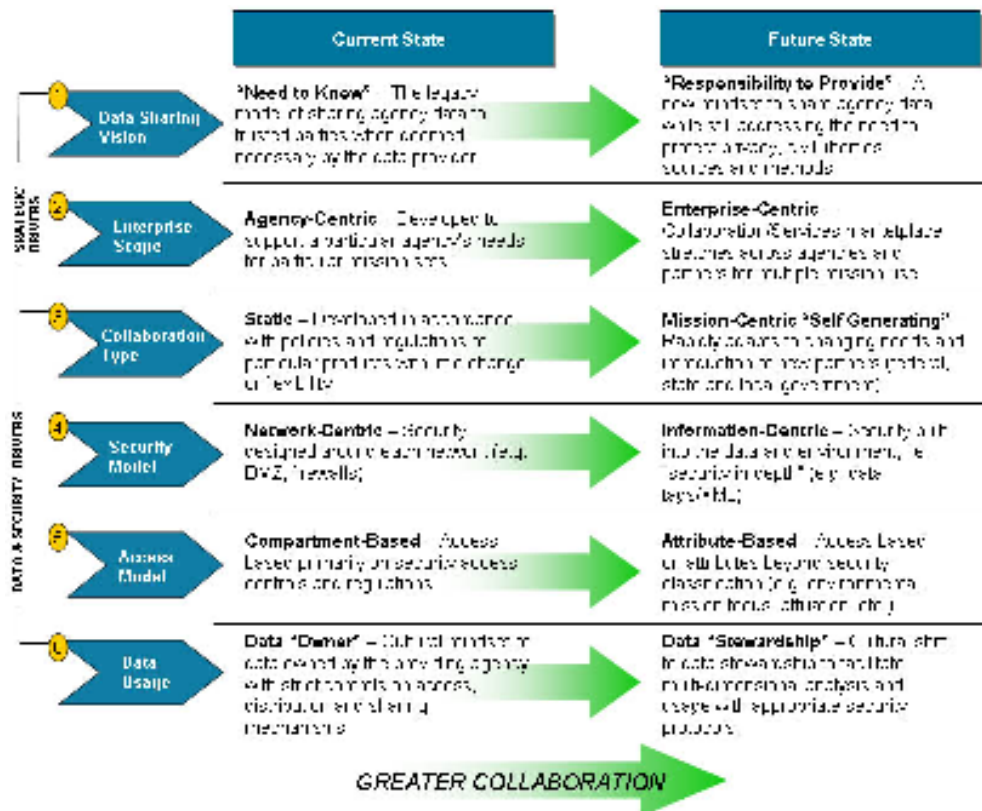
Objective 2.1:   Institute uniform information sharing

      ✍   Strategies:

2.1.1   Develop a framework to increase information sharing across COIs

2.1.2   Educate Commonwealth stakeholders on the benefits of sharing through training programs and standards for data sharing policies and procedures

2.1.3   Resolve data sharing disputes through the governance process

2.1.4   Explore the feasibility of an enterprise operational data store and/or an enterprise publication and subscribe messaging system.

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[2] This model has been adapted from the information sharing model developed by DNI.

Objective 2.2:   Enhance collaboration across the Commonwealth

↳   Strategies:

2.2.1   Develop information sharing communication programs to create awareness of a "responsibility to provide" culture

2.2.2   Create award and assessment programs to transform from a "need to know" to a "responsibility to provide" mindset

2.2.3   Serve as an integration point for establishing a virtual collaboration environment to facilitate collaboration and information sharing

2.2.4   Enable COI stakeholders and partners to connect on a time-imperative basis to fulfill their mission requirements

2.2.5   Work with individual agencies to discover "low hanging fruit" related to opportunities for data sharing.

Goal 3: Establish data governance and oversight

Decisions made about enterprise data must be aligned with the overall business strategy of the enterprise; data governance provides the framework. The primary objectives of good governance are to improve the speed and effectiveness of decisions and processes (efficiency), to make maximum use of information in terms of value creation, and to reduce costs and risks. Direct business involvement in governance is necessary to ensure continued alignment with business objectives.

Data governance and oversight allows us to exercise authority and control (planning, monitoring and enforcement) over the management of data assets, thereby ensuring data is accurate, appropriately shared and protected. The DAMA governance model served as a reference for Goal 3 objectives; details on this model can be found in Appendix C.

Objective 3.1:   Define, approve and communicate data strategies, policies, standards, architecture, procedures and metrics

      ↳   Strategies:

3.1.1   Develop and maintain the data strategy

3.1.2   Establish data professional roles and responsibilities

3.1.3   Identify and appoint data stewards

3.1.4   Establish data governance and stewardship organizations

3.1.5   Develop and approve data policies, standards and procedures

3.1.6   Review and approve data architecture

Objective 3.2:   Track and enforce regulatory compliance and conformance to data strategies, policies, standards, architecture and procedures

      ↳   Strategies:

3.2.1   Catalog and track legislation and regulations related to data collection, dissemination, ownership and responsibility.

3.2.2   Leverage the Data Management Association (DAMA) data governance framework

3.2.3   Coordinate data governance activities

3.2.4   Monitor and ensure regulatory compliance

3.2.5   Monitor and enforce conformance with data policies, standards and architecture

3.2.6   Propose changes to legislation and regulatory language as it relates to COVs ability to share and integrate data.

Objective 3.3:   Sponsor, track and oversee the delivery of data management projects and services

✎   Strategies:

3.3.1   Plan and sponsor data management projects and services

3.3.2   Oversee data management projects and services

Objective 3.4:   Manage and resolve data related issues

✎   Strategies:

3.4.1   Manage and resolve data related issues

3.4.2   Oversee data management projects and services

Objective 3.5:   Understand and promote the value of data assets

✎   Strategies:

3.5.1   Understand strategic enterprise data needs
3.5.2   Communicate and promote the value of data assets

X.   Conclusion

Data is essential to delivering government services. As the Commonwealth continually strives for innovation and improvement, government business is in a position to leverage technology to realize new opportunities to use Commonwealth data assets for even greater efficiencies and better service delivery.

Data management will provide a framework for cost effective use and protection of data, enterprise data sharing will foster collaboration, and sound governance will ensure alignment with business strategy and delivery of business value.

This strategy serves as a starting point and guide in forming a solid foundation for long-term change. Not all of the objectives contained in this plan are yet supported by strategies; some strategies cannot be specifically identified until implementation has begun. Questions will be driven out as the strategy moves forward which can only be answered through the process of implementation.

Also, while some of the strategies laid out in this document are already underway, the resources to implement *all* of the strategies in this plan do not currently exist. Hence, a part of advancing the strategy is to identify ways to pool current and potential resources and leverage best practices currently in development. This plan seeks to point toward ways to deploy existing resources where possible in support of the larger vision, while seeking additional funding for the broader scope.

The strategies recommended here are only the beginning, but they are the building blocks of a solid foundation for ongoing and future leveraging the Commonwealth's data assets. The continued commitment and participation of Commonwealth agency stakeholders in advancing this vision is necessary to keep this plan responsive to Commonwealth agencies and the citizens, businesses, and governmental organizations they serve.

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XI.   Appendix A - Gartner Group Data Management Maturity Model

The Gartner Group, the world's leading IT research and advisory company, has developed the "Data Management Maturity Assessment Model" shown in Figure 4.   It is a useful guide to evaluate current maturity levels and can help in prioritizing actions to advance the effectiveness of Commonwealth data management. Considering this model can also assist organizations in determining where they are relative to the industry as a whole.

Figure 4. Data Management Maturity Characteristics

|		Low >>>		Maturity Level	>>> High	
		Opportunity	**Fragmented**	**Standardized**	**Managed**	**Optimized**
Data Management Initiatives	**Data Manage-ment Delivery**	Data infrastructure used by individual applications	Data infrastructure shared by limited applications	Data infrastructure standardized across applications	Data infrastructure is shared and managed across agencies	Data infrastructure contributes to business performance
	Data Sharing	Data is not shared between or across applications	Data is shared within an agency or between agencies in non-standardized format	Data is shared across agencies in a standardized format	Enterprise data is shared consistently as needed	Data sharing capability meets requirements of all business processes
	Enterprise Data Ware-housing	Data is only available within application silos	Some data consolidated for tactical needs	Enterprise data warehouse established and deployed to selective business subject areas	"Single version of the truth" deployed for enterprise-scale information needs	Enterprise data warehouse contributes to agency performance
	Metadata Manage-ment	Little descriptive facts about data is known	Some awareness of descriptive facts about data	Standardized for information sharing	Governed and used across application initiatives	Business strategy supported throughout enterprise
	Data Quality	Little to no awareness of data quality	Reacting to the need for new tools and processes to understand data quality	Consistently reporting and addressing data quality issues	Formalized governance processes and deploy-ment of data quality tools	Data quality rules, processes and tools are deployed enterprise-wide
	Impact of Data in Agency	Little to no importance given to data	Data management is part of	Data management is part of inter-	Data management is always part	Business activities include data

		Low >>>	Maturity Level		>>> High	
		Opportunity	Fragmented	Standardized	Managed	Optimized
	Activities	management	agency initiatives on an ad hoc basis	agency initiatives strategic to the enterprise	of business initiatives	management as part of strategy and plans

Adapted from Gartner "Toolkit: Data Management and Integration Maturity Assessment" (December 2008)

XII.   Appendix B - DAMA International Functional Framework

DAMA International is a not-for-profit, vendor independent association of technical and business professionals dedicated to advancing the concepts and practices for data resource management and enterprise information. DAMA developed the Data Management Body of Knowledge (DMBOK) to define industry standards and best practices in data management. The Commonwealth Data Strategy will leverage DMBOK guidance and standards.

Figure 5. DAMA Functional Framework
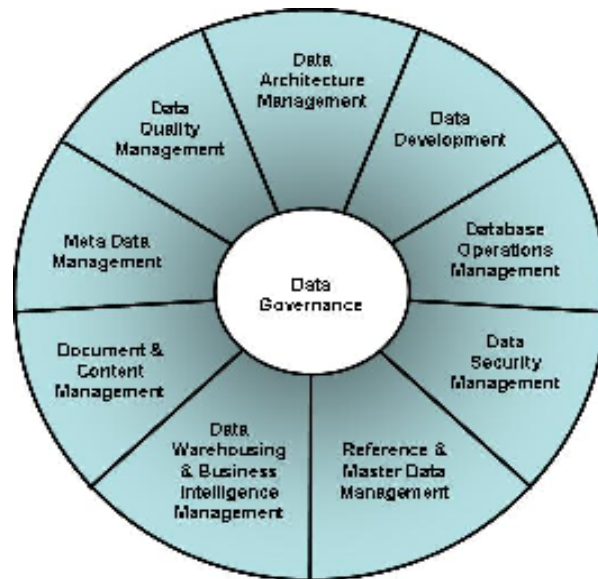
The ten component functions of data management are:

1. Data Governance: The exercise of authority and control (planning, monitoring and enforcement) over the management of data assets.

2. Data Architecture Management: Defining the data needs of the enterprise and designing the master blueprints to meet those needs.

3. Data Development: Designing, implementing and maintaining solutions to meet the data needs of the enterprise.

4. Data Operations Management: Planning, control, and support for structured data assets across the data lifecycle, from creation and acquisition through archival and purge.
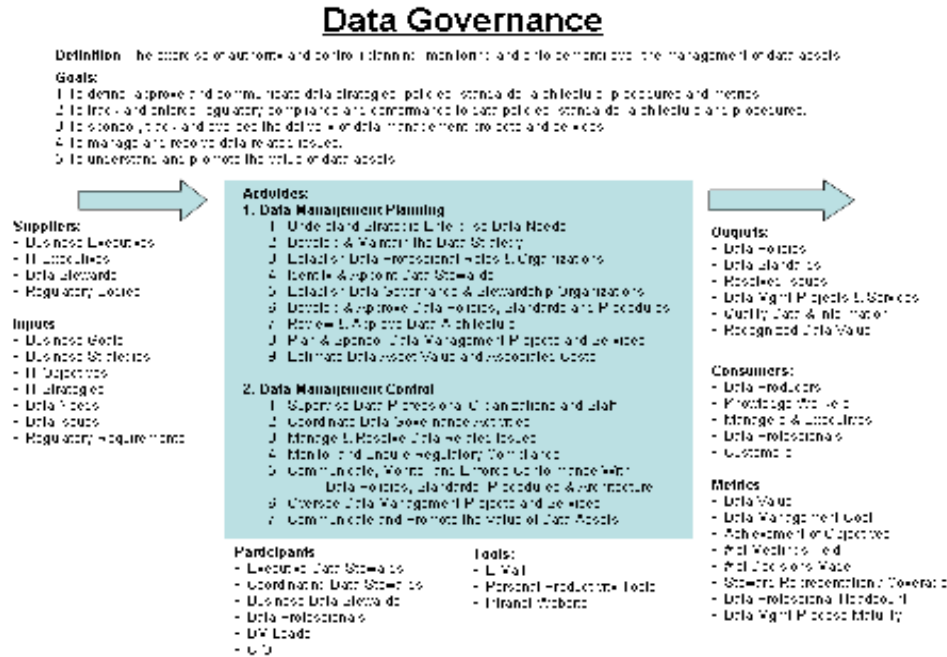
5. Data Security Management: Planning, development and execution of security policies and procedures to provide proper authentication, authorization, access, and auditing of data and information.

6. Reference and Master Data Management: Planning, implementation, and control activities to ensure consistency with a "golden version" of contextual data values.

7. Data Warehousing and Business Intelligence Management: Planning, implementation, and control processes to provide decision support data and support for knowledge workers engaged in reporting, query and analysis.

8. Document and Content Management: Planning, implementation and control activities to store, protect and access data found within electronic files and physical records (including text, graphics, images, audio and video)

9. Meta-data Management: Planning, implementation and control activities to enable easy access to high quality, integrated meta-data.

10. Data Quality Management: Planning, implementation, and control activities that apply quality management techniques to measure, assess, improve and ensure the fitness of data for use. [3]

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[3] Excerpted from The DAMA Guide to the Data Management Body of Knowledge (DAMA DM-BOK Guide), copyright © 2009 by DAMA International

Figure 6. DAMA Context Diagram for Governance Functions[4]

Figure 6 provides an example of the DAMA details for one of the functions in the functional Framework above. The DAMA DM-BOK illustrates this for each of the ten functions in the framework; Data Governance is shown here as an example of the type of guidance this strategy will leverage as it moves forward.

XIII. Appendix C – Alignment to the Commonwealth Strategic Plan for Information Technology

This chart demonstrates the alignment of the goals of the Commonwealth Strategic Plan for Applications with the goals of the Commonwealth Strategic Plan for Information Technology.

Commonwealth Strategic Plan for Information Technology Goals / Commonwealth Data Strategy Goals	1 Increase accessibility to government	2 Facilitate IT collaboration and partnerships	3 Ensure a trusted and reliable technical environment	4 Create a reputation of performance for technology	5 Increase workforce productivity through the use of technology
1 Implement an enterprise data management program	Contributing	Contributing	Primary	Contributing	Contributing
2 Enable enterprise data sharing	Contributing	Primary	Contributing	Contributing	Contributing
3 Establish data governance and oversight	Contributing	Contributing	Contributing	Primary	Contributing